BIOLOGICAL NOTES

THE PELAGIC STAGES OF YOUNG FISHES.—The memoirs by Alex. Agassiz, on the young stages of osseous fishes, have been noticed from time to time in our pages. In connection with C. O. Whitman, he has quite recently published, as the first part of vol. xiv. of the *Memoirs* of the Museum of Comparative Zoology at Harvard College, an account of the pelagic stages of young fishes, which is illustrated with nineteen very beautifully-executed plates. This memoir is devoted to descriptive sketches of the different fish-eggs which have come beneath the notice of the authors, and of the early stages of the fish after their escape from the egg. In a second portion of the memoir it is proposed to treat of the earlier stages of cleavage, the formation of the embryonic ring, the formation of the various portions of the embryo, and so on. The pelagic eggs, so far as the authors' experience goes, may be divided into—(1) those without oil-globules, and (2) those with one or more oil-globules. But this, while a convenient, is not an accurate division, because, if eggs apparently without oil-globules are carefully examined, the yolk-mass will be found permeated with minute fatty bodies, but these are never seen to coalesce to form conspicuous oil-globules. Some pelagic eggs are laid singly—this seems to be the most common condition—and are left to float at the mercy of the waves and winds, while others are laid in an investing gelatinous mass. The single eggs seem to have the best chance of escape from their numerous enemies, while as to those laid in masses the chances seem all against them. When first laid, pelagic eggs are usually perfectly transparent; little by little, with the formation of the embryo, chromatophores are formed, generally upon the surface of the yolk-mass close to the embryo, or upon the embryo itself. These chromatophores, at first colourless, soon become pigmented, and while the young embryo is still within the egg, the characteristic colour-pattern is often clearly indicated. All the eggs described in the memoir, except when confined in masses, float with the embryo downwards. The resorption of the yolk-mass differs greatly in the different species. The rate of resorption also varies, and would seem to be correlated with the degree of development of the structural features of the embryo. The chromotaphores very rarely become dendritic before the embryo is hatched, and as a rule not till then does the black eye-pigment make its appearance. The first fins formed are the pectorals, traces of which appear in very early stages within the egg. The closing of the blastopore and the disappearance of the vesicle of Kupffer are followed by the growth of the tail and the formation of an embryonic caudal fin. Usually at the time of the resorption of the yolk-mass the pectorals are well developed, and have become powerful limbs; then, too, the intestinal tract lengthens, and a swim-bladder and larger alimentary canal appear. In the very youngest stages, immediately on leaving the egg, the embryo depends mainly upon its embryonic dorsal and ventral (its leptocardial fin) fin for locomotion. The propelling powers are proportionally very large, and at no time of its life is the young fish better provided with both means of locomotion and sense-organs. With growth the young fish depends, however, more and more for locomotion upon the use of its pectoral fins. The comparatively large size of the chorda in the earlier embryonic stages is a marked feature of all young fishes. The regularity with which the same stages of development of identical species appeared in successive years was very striking, and the authors note that this regularity was not peculiar to young fishes, but that they also found the spawning of the majority of marine animals and their rate of development practically identical year after year; as instances of the latter they refer to embryos of Agalma, Balanoglossus, Plagusia, &c. To facilitate the identification of the different pelagic stages of fish and fish-eggs, a table is given, in which we find the most characteristic features of the eggs and young fish so far as these have been observed, the date of their occurrence, the distinctive features at time of hatching, with references, so far as the forms described in this memoir are concerned, to its pages and its figures, and for the rest to authorities where they have been described. The figures on the plates are from sketches from life made by A. Agassiz and Whitman. We trust soon to be able to notice the second portion of this important memoir.

DANAIS ARCHIPPUS—AN ENTERPRISING BUTTERFLY.—As an instance of a species extending its geographical area under our observation, perhaps there is none more remarkable than the case of a beautiful and noteworthy butterfly whose natural history is so pleasantly written about in the *Entomologist's Monthly Magazine* for March 1886 by Mr. James J. Walker, R.N. We would that our British Navy had many more such excellent observers. This butterfly, which, according to the rules of zoological nomenclature, is called *Anosia plexippus*, L., is perhaps better known by its synonym, *Danais archippus*, F. The original home of this insect is the American continent, where, including some well-marked varieties, it now enjoys a vast range, extending from the Hudson's Bay Territory and Canada to the region of the Amazons, Bolivia, and the estuary of the Rio de la Plata. Nearly everywhere through this vast area it is common, and in some places it occurs in vast swarms. Thus Mr. Riley says that at Missouri the air is sometimes filled with these butterflies to a height of from 300 to 400 feet. These swarms appear in autumn, and some of them seem to migrate southwards to warmer regions at the approach of winter. The caterpillar is singularly hardy, handsome, and easy to rear; it feeds on various species of Asclepias, a genus belonging to one of the most interesting families of plants known. All the species of the genus are peculiar to the New World—and to the northern portions of it, just that area which seems to have been the birth-area of our butterfly—or to tropical Africa. Many of them are hardy even in this country, and are easily increased, taking care, as a gardener would say, of themselves. *A. tuberosa* is a fine border plant; *A. cornuti* has sweet-scented flowers; while *A. curassavica*, though bearing showy flowers, has a fœtid perfume, like its congeners, the Stapelias, those African Asclepiads so attractive to the carrion-flies; this last species is the one so fully described by H. Müller as fertilised through the agency of Lepidoptera. The chrysalis of *D. archippus* is described as very beautiful, being of a bright, translucent, emerald-green colour, with some transverse black ridges, brilliantly-gilded lines, and minute spots of a bright gold hue, and the duration of the pupal condition is from fourteen to twenty days. Insect-eating birds do not touch either larval or perfect forms, which are free even from Ichneumon guests. It is interesting to note that Mr. Riley has found the larva attacked by a Dipteron, this group of insects being intimately connected with the life-history of Asclepiads. The longevity of the imago is most remarkable. Taking all these facts into consideration, we find this butterfly well outfitted for the battle of life: the perfect insect strong on the wing, with from twelve to fifteen months of a life; eggs soon hatching, after being laid on the food-plants, these themselves spreading like weeds; larvæ not molested by destructive parasites. The first great march westwards was over 2350 miles to the Sandwich Islands, and remembering that the appearance of the insect here is subsequent to commerce with these islands, the probability is that it was helped across this expanse of ocean, and then it in a wonderfully steady and rapid manner spread across the whole breadth of the Pacific Ocean, and far into the Malay Archipelago. Carrying on its course round the world, we may soon expect to hear of it in Asia. Southwards and westwards it has appeared in New Zealand and Australia. After enterprise like this, it does not seem surprising that eastward it should have flown to the West Indies, and at least one or two examples to the Azores; and within the last ten years it has put in an appearance and been speedily captured in South Wales, Devon, Isle of Wight, Dorset, Sussex, and Kent. In 1879 a specimen was even taken at La Vendée. While as garden plants species of Asclepias are fairly common in Britain, in Europe other food-plants might be found in *Vincetoxicum officinale* and *Cynanchum acutum*. With such a startling phenomenon in distribution, which in so gay and fine an insect cannot easily be overlooked, a great light is thrown on the diffusion under perhaps even more favourable circumstances as to the distribution of less conspicuous species. We should have welcomed some remarks from Mr. Walker's pen about the varieties that may have arisen from the very varied surroundings that environ the butterfly; one of these, *D. erippus*, seems by some entomologists almost to take rank as an independent species; that is to say, that it has passed too far away from the type to be easily recognised as such.

GEOGRAPHICAL NOTES

THE following medals have been awarded by the Geographical Society of Paris for 1886:—The principal gold medal to MM. Capello and Ivens for their three journeys across Africa; gold medal to the Pandit (name not specified, but doubtless A——K) for his journey in Tibet; the Lagerot prize to M. Morsche for his explorations in the Philippines; a silver medal to M. Bloyet

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for his topography of Eastern Africa; and the bronze medal to M. Mager for his *Atlas Colonial*, published by M. Bayle.

Ethnologists will be glad to know that the February number of the *Bolletino* of the Italian Geographical Society contains a full descriptive account of the objects forwarded to Europe by Romolo Gessi after his return to East Central Africa in 1877. These objects have now been added to the rich collection which he had already presented to the Geographical Society, and which has found a permanent home in the Prehistoric and Ethnographic Museum in Rome. Amongst the objects specified by Dr. G. A. Colini, to whom the public is indebted for this paper, mention is made of a stool from the Bongo tribe (Upper White Nile) with feet made exactly like the boots usually worn by European ladies. This object was locally known as "the lady," and it is suggested that the native artist took for his model the boots belonging to Miss Tinné. The artistic talent of the Bongos is, however, better illustrated by the figure of a man 0·69 metres high, wearing a girdle of cylindrical glass trinkets, and with upper lip and ears pierced for the insertion of the iron rings commonly worn by this tribe. From the Latuka people on the opposite or east side of the Nile come ivory trumpets, wooden clubs with iron heads, curious knives with slightly curved blade and wooden handle inlaid with iron plaques, and a very fine helmet decorated with shells, red and blue glass beads and a triangular brass plate in front. The A-Zandeh (Niam-Niam) and Mangbuttu (Monbuttu) objects are distinguished by their number, variety, and richness, including articles in wood, iron, and ivory: arms, ornaments, utensils, and musical instruments. The ivory carvings often display great taste in the designs and technical skill in the execution, fully bearing out the accounts of Schweinfurth and other travellers regarding the great artistic talent of these cannibal tribes. Archæologists will be interested to know that amongst the Mangbuttu objects is a splendid polished stone hatchet 0·25 metres long, with circular section, and terminating above in a point, which must be classed with the prehistoric hematite weapons supposed by the natives to have fallen from the clouds. Nearly all the tribes of the Upper Nile Valley, and even several of the equatorial lake region, such as the Waganda and Wanyoro, are represented in this very valuable ethnological collection, probably the most complete yet brought together from that quarter of the globe.

At the meeting of the Paris Geographical Society of the 19th ult. Vicomte de Brettes described the results of an exploration made by him during last year in the southern Grand Chaco. Since the commencement of the sixteenth century forty-three expeditions have attempted to discover a communication between the regions on the eastern slope of the Andes with those on the left banks of the rivers Paraguay and Parana. These expeditions have constantly followed the courses of the Pilcomayo and Vermejo, and have ultimately demonstrated the impracticability of these routes by reason of the numerous rapids, as well as of the shallowness of the water. The route so actively sought for three centuries by the Argentine Republic, Bolivia, and Paraguay, which would increase their trade tenfold, has never yet been sought by land, and since the Spanish conquest the interior of the southern Grand Chaco has remained wholly unknown. M. de Brettes undertook this exploration, and entered the region accompanied only by two Cbenupis Indians. He discovered three rivers and an immense salt lake, on the banks of which he marched 113 miles, when ague and fever compelled him to return to Corrientes after a journey of 436 miles in a hitherto-unexplored region. The country traversed by him is absolutely flat, mimosa-trees and palms grow in abundance, and there are vast prairies and swamps, inhabited by the Chenupis, Mocovis, Velelos, and Matacos—all tribes still in an extremely barbarous state. The lecturer referred to various unpublished documents respecting these tribes, including a grammar of the Topii language, which is in the press. He also announced his intention of returning to the Chaco to continue the work which was arrested by illness. He appears to have received the most cordial assistance from the Argentine authorities.

On February 12 General Prjevalsky gave a lecture on his fourth journey to Central Asia before a distinguished audience at St. Petersburg. He entered into details on the sources of the Yellow River, and described the environs of Lob-nor, dwelling upon the peculiar features of the population of the surrounding country. Then the lecturer passed to the orographic outlines of the Alpine country, the numerous chains of which had been first traced by himself, and finally concluded his account by describing the valley of the River Tarim. The lecture was very well illustrated.

The March number of the *Proceedings* of the Royal Geographical Society has for its leading paper an account, by Col. Stewart, of the Herat Valley and the Persian border, from the Hari-rud to Sistan. It contains a large amount of interesting information respecting a region which appears destined to play a larger part in the public eye of England in the future than even in the past. The discussion which followed adds much to the paper, and this is especially the case with the remarks of Surgeon Aitchison, the naturalist to the Afghan Delimitation Commission, who read an account of the botany of the region. Major Greely's lecture on Arctic exploration with reference to Grinnell Land is also published. The number also contains summaries of two lectures, and the subsequent discussions, at the Exhibition of Appliances used in Geographical Education, the lecturers being Profs. Bryce and Moseley.

The March number of the *Scottish Geographical Magazine* commences with a paper by Col. Stewart on a visit to Badghis in 1883, and to the Herat Valley in 1885. It also contains a paper by Prof. James Geikie on mountains—their origin, growth, and decay; and a brief account of Dr. Boas's recent journeys in Baffin Land. The geographical notes are very comprehensive; amongst them is one, taken from the *Geographischer Jahrbuch*, 1885, containing statistics of the geographical societies of the world. It is somewhat humiliating to find Great Britain and her colonies only third on the list in point of members, and fifth in the number of societies. France has 26 societies with 18,000 members; Germany 24, with 9300 members; while the British Empire has 5 societies, with 5300 members. The United States is even worse, for it has only 2 societies, with 1500 members.

At the last meeting of the Geographical Society of Paris, M. Hansen-Blangsted read a note on the disagreement between geographers as to the highest peaks in Denmark. According to the maps of the general staff at Copenhagen, the highest hills were in the south-west of the department of Aarhus. Himmelberg was long regarded as the principal eminence in Denmark; it is 147 metres in height. But in the forest of Ky, in the south of the commune of the same name, there are several unnamed heights, one of which is 163 metres high. Himmelberg is now only the third in height, and possibly it will have on examination to take even a lower place. Communications were read from Gen. Annenkoff on the Transcaspian Railway and the region it traverses, from M. Thouar on his exploration on the Pilcomayo, and from M. Duveyrier on some Sahara longitudes.

In the last number of the *Transactions* of the Halle Verein für Erdkunde, Herr von Brandis describes some curious observations which he made during a year's residence in 1861-62 on the slope of the active Java volcano Merapi, which has lately been in eruption. From the crater two perfectly straight white columns of steam (not smoke), of equal thickness above and below, ascended. For some weeks the colour was of an equal degree of whiteness throughout; both were of equal height, and from measurements made this varied from 320 to 450 metres. The upper ends were cut off sharply like the ends of two tapers, and the thickness of one varied from 5 to 15 metres, while the other was only about half this. The distance between the two appeared to be about 20 metres. The colour of the smaller of these pillars appeared to alter occasionally, but the wind did not seem to have any effect in causing them to deflect from the perpendicular. At first the observer thought there must be perpetual calm at this altitude; but this is not so, for others have found that a south-east wind blows constantly there. The effect of a current of air blowing from this direction would have been readily perceptible to Herr von Brandis in the position his residence occupied. This curious phenomenon was observed in 1836 by Junghuhn, of Madgeburg, who ascended the mountain, but the conditions of the summit do not appear to have been sufficiently investigated to enable a positive explanation of it to be made.

It is stated that M. Rogozinski, who is at present in Cracow, is preparing a dictionary and grammar of the idioms of the Cameroon tribes.

M. Rolland has been charged by the French Minister of Public Instruction with a mission to Madagascar, to study its mineralogy, botany, zoology, and anthropology.

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